

# Craft, Design and Technology - The Spearhead for our Future\*

During the last three years my colleagues and I have had the privilege of studying in depth how the design process, as understood in the industrial sector, could be introduced into the secondary school curriculum. Although we had been working with schools for several years, the speech by Mr. Callaghan in October 1977 focused our attention on determining what really could be done to link the world of industry and education.

In 1979 we set up the Fulmer Industry/Education Project to develop ways of improving the image and explaining the role of technology and engineering in schools. The reason for the work was threefold: firstly, the poor status of technologists and engineers in our society, secondly, the present educational requirements for students entering engineering courses and thirdly, the need to attract more able children from the arts and science streams into technological courses on a broad front.

As a contract research and engineering company, owned by the Institute of Physics, employing 150 qualified people in subjects ranging from physics, chemistry and mathematics through to ceramics, plastics and mechanical engineering, we see at first hand the educational and technological opportunities, open to this country. The graduates in our company earn their livelihood by using the information and expertise taught at school and college in the development of innovative and successful products; we are always pleased to remind teachers of science subjects that what they teach in schools has a use other than passing examinations.

It is vital to our future that we are no longer indifferent or bored with the role engineers play in our society, since it is the major wealth-creating activity in Britain. For too long we have been preoccupied by wealth distribution instead of wealth creation. The result has been that since the end of World War II Britain has lost a car, a motorcycle, an optical and a host of other industries to other countries. The causes are complex, but the education system has to take a share of the responsibility.

All parts of society need to realise that our fortunes have radically changed and that we cannot continue to pay ourselves more than we earn. If we are to reverse the present disastrous situation, then we need to manufacture products which other countries wish to buy. This is the way other prosperous nations in the Western World earn their living and we must learn to compete alongside them if we are to maintain and develop the standards to which we have become accustomed.

These changes in our fortune must be reflected in our education system. Our observation is that the modern craft, design and technology movement can spearhead the desirable and essential changes needed in our school curricula.<sup>1</sup> We confirm what prominent commentators have said of the education system; that it stresses on the one hand the importance of analysis, criticism and the acquisition of knowledge, while on the other hand it neglects

the formulation of solutions to problems — doing, making and organising.

From the standpoint of the real world, the secondary education system is largely artificial: it is as if someone having seen how real life problems are solved has produced a system perverse in every way. This can be illustrated by seeing a group of children taking their 'O' level examinations, especially in science-based subjects. Implicitly, the examination is based on the following set of rules: problems last half an hour, all the information is given — no more and no less, copying is not allowed and the problem must be attempted by oneself. The student is encouraged in the knowledge that the problem will have a definite answer even if he is unable to actually solve it. Compare this traditional educational way of solving problems with that found in real life. Firstly, problems rarely are solved within a statutory half an hour, they might be solved quickly by inspiration or on another occasion no solution can be found; in terms of the information available, in some cases there is a mass of extraneous material and the one piece really necessary to solve the problem is not to be found. As to the emotive subject of copying, in the real world this is considered an excellent and sensible way to deal with problems, however respectable words are used to describe these activities such as, literature survey, patent review or the critical examination of existing products. Solving problems by oneself in the bleak isolation of a school hall can hardly produce the best results from anyone; in real life most people solve problems with the help of others, each contributing their special talent. Finally, however, in the real world the original problem may not have any one answer that can be marked right or wrong. It is always a surprise to us how the people who have devised our education system would scorn examining children in the mode described above. We would ask them to try working

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in what is a risk situation and realise how much more difficult this can be compared with our traditional approach to problem solving.

We believe that our children should be introduced to the ways that real problems are solved during their school life and further, the qualities needed to operate in this way should become a part of the student's assessment. Such principles are engendered in the modern CD and T syllabi which allow the students to demonstrate their ability across a much broader range of subjects.

For an effective and lasting change to be made in the teaching and assessment of our children it will be necessary to persuade several parts of the education system of the benefit of such an approach. The argument must be understood firstly by the universities who determine entrance requirements to courses, the examination boards, the head-teachers and careers officers, the parents and, last and by no means least, our children.

None of these changes can take place without the enthusiastic support of teachers of craft, design and technology subjects. They have a major responsibility for inspiring directly in the classroom the next generation of designers, technologists and engineers on whom the future prosperity of this country largely depends.

From the results of our work in schools, we believe there are several ways in which C, D and T teachers can help to promote this vital cause:

Firstly, they should explain to teachers in other subject areas that technology is to do with people as well as things; that technology is about translating human needs into practical solutions. As part of such a discussion they should explain that technology is strongly linked to the whole 'design process' whose main pillars are:

- Determining the need
- Solving the associated problem
- Selecting an optimum solution
- Making something.

Secondly, they should explain and show examples of how the modern C, D and T courses are not fancy titles for the traditional woodwork and metalwork subjects. Certainly the ability to work with metal and wood are important, but equally the facility to handle clay, paper or any other material is equally valid.

Thirdly, C, D and T teachers should demonstrate that to effectively pursue technology it is necessary to have a good knowledge of the rest of the curriculum. Also it is important to show that technology enters into the other subjects taught in the school, be it English, history, geography or athletics.

Fourthly, they should emphasise that the design process is equally acceptable to boys and girls. At the present time we lose half our engineering talent through girls believing that these subjects are not for them.

Fifthly, teachers of this subject should not forget that craft is just as important as design and technology. The manifestation of any design relies

ultimately on the craftsmen and so his part in the team is completely complementary. Craft should not be seen as of lesser importance or, as some people believe, an occupation for that most damning phrase – the less able child.

Sixthly, C, D and T should make closer links with industry, particularly in the area of project work. All companies have new products under development, and in many cases can well use the creative talents residing in our schoolchildren. For example in one of our project schools the Sixth Form students linked up with a large national company as a source of industrial design projects for the 'A' level engineering examination. Projects included the development of an all electronic, automatic recording weather station, fume cupboard air flow devices for laboratories and environmental monitoring systems for plant growth. Such projects really test the ability of students to demonstrate the application of the design process to real problems. In the courses of such work the students spend time at the company and, in return, engineers visit the school and learn about the education system. Through this route permanent and natural links with companies ensue to the benefit of industry and education.

Finally, C, D and T teachers should be encouraged to make closer links with their feeder primary schools in order to introduce courses in technology awareness. From our own recent research we consider that the design process could be one of the most valuable activities for linking the primary and secondary systems. With good co-ordination and planning such a strategy helps to make children more receptive to technological subjects when arriving at the secondary school.

At the present time, Government, education and industry applaud the development of C, D and T courses in schools; we would go further and suggest that they should spearhead the school curriculum. Never before has such a favourable climate presented itself, and it is up to teachers of the subject to respond positively to the challenge. In the last three years we have met many people throughout Britain associated with this modern movement and there is no doubt that what can be achieved is not limited by materials, buildings and staff, but by vision on the part of teachers.

From the standpoint of industry, where the students who are taught the subjects will eventually make their mark, we offer every support for if the present opportunity is taken then C, D and T could achieve the status it deserves in the curriculum and, at the same time, help achieve a successful future for this country.

#### Reference

1. The Need to Diverge – W.E. Duckworth and R.H. Lewin, *Times Educational Supplement*, 22 May 1981.